Photosynthetic light responses of wild and cultured Halophila ovalis

ABSTRACT

A laboratory based experiment was performed on leaves of the seagrass Halophila ovalis to elucidate its photosynthesis versus irradiance (P-I) relationships. Plant samples were sourced from a low water level seabed off the Teluk Kemang coast (2° 30′N, 101° 45′E) in Negeri Sembilan, Malaysia. Plants growing naturally from this area as well as those transplanted into indoor culture tanks were studied. The oxygen evolution responses of the leaves based on parameters of leaf fresh weight (FW), leaf surface area (Area) and leaf chlorophyll content (Chl) towards varying degrees of illumination were recorded. A comparison between leaves from cultures with those from the wild showed that the curve plotted for its respective values was lowered for the former based on FW and Area but comparatively lowered based on Chl. The light compensation (Ic,) value did not vary much between leaves from the wild and leaves from the cultures (8-13 µmol m-2 s-1) while light saturation point (Ik) was in the range of 268 - 275 µmol m-2 s-1 for leaves from the wild and increased to 290 - 293 µmol m-2 s-1 for leaves from cultures. Dark respiration values did not differ between wild and cultured leaves based on the measurements calculated from the parameters stated (FW, Area and Chl). Calculations based on FW and Area showed a higher light saturation (Pmax) photosynthetic rate for cultured leaves but comparatively lowered based on Chl. Pmax values between leaves from culture to that from the wild based on the parameters of FW and Area were significantly different ($p<0.05$) but not based on Chl while the trends of curves fitted between wild and cultured leaves were significantly different based on Area only ($p<0.05$). The results collated in this study serve to add to the present knowledge of biological traits of H. ovalis from Malaysia to further understand its importance in local waters.

Keyword: Halophila ovalis; Photosynthesis-irradiance curves; Seagrass; Shading